AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-29 (cancelled).

30 (previously presented). A process for the production of biodegradable polymer particles which comprises:

a) introduction of at least one inducible gene into a microorganism, wherein the gene codes for a protein which controls the size of the polymer particles and is selected from the group which comprises the phasin gene phaP from *Ralstonia eutropha* and the phasin gene phaF from *Pseudomonas oleovorans*;

b) introduction of at least one further gene which codes for a protein involved in the formation of the polymer particles;

wherein at least one of the genes introduced into the microorganism in a) and b) comprises a polymer particle binding domain and at least one binding domain, wherein the at least one binding domain is capable of binding a biologically active substance and/or a coupling reagent; and

c) cultivation of the microorganism with induction of the at least one inducible gene stated in a) in a culture medium under conditions which are suitable for the production of the biodegradable polymer particles by the microorganism.

31 (previously presented). A process according to claim 30, wherein the at least one further gene which codes for a protein involved in the formation of the polymer particles codes for a thiolase, a reductase or a polymer synthase.

32 (previously presented). A process according to claim 31, wherein the at least one further gene which codes for a protein involved in the formation of the polymer particles codes for phaA thiolase, phaB ketoacyl reductase or phaC synthase from *Ralstonia eutropha*.

33 (previously presented). A process according to claim 30, wherein at least one additional gene which codes for a thiolase and/or a polymer synthase is introduced into the cell.

34 (previously presented). A process according to claim 30, wherein at least one fatty acid with functional side groups and particularly preferably at least one hydroxy fatty acid and/or at least one mercapto fatty acid and/or at least one β-amino fatty acid is introduced into the culture medium as a substrate for the formation of the polymer particles.

35 (previously presented). A process according to claim 30, wherein a substrate is added to the culture medium in such a quantity that it is sufficient to ensure control of the size of the polymer particles.

36 (previously presented). A process according to claim 30, wherein the microorganism used is selected from the genera comprising *Ralstonia, Alcaligenes, Psuedomonas* and *Halobiforma*.

37 (previously presented). A process according to claim 36, wherein the microorganism used is selected from the group comprising *Ralstonia eutropha, Alcaligenes latus, Escherichia coli, Pseudomonas fragi, Pseudomonas putida, Pseudomonas oleovorans, Pseudomonas aeruginosa, Pseudomonas fluorescens,* and *Halobiforma haloterrestris.*

38 (previously presented). A process according to claim 30, wherein the cultivated microorganisms are disrupted in per se known manner and the polymer particles then separated from the cell debris.

39 (previously presented). A process according to claim 38, wherein a lipid layer located on the surface of the polymer particles is separated from the polymer particles obtained according to the process of claim 38 and replaced by a lipid layer of another composition.

40 (previously presented). A process according to claim 30, wherein particle size is controlled by the at least one inducible gene in such a manner that the polymer particles formed have a diameter of 10 nm to 3 μm, preferably a diameter of 10 nm to 900 nm, and particularly preferably a diameter of 10 nm to 100 nm.

41 (previously presented). A process according to claim 30, wherein the polymer particle binding domain comprises part of a protein bound to the surface of the polymer

particle, wherein the protein is selected from the group comprising a polymer depolymerase, a polymer regulator, a polymer synthase and a particle size-controlling protein.

42 (previously presented). A process according to claim 30, wherein the at least one binding domain which is capable of binding a biologically active substance and/or a coupling reagent is selected from the group comprising oligopeptides, enzymes, abzymes or non-catalytic proteins.

43 (withdrawn). A process for the *in vitro* production of biodegradable polymer particles consisting of polyhydroxyalkyl carboxylates which comprises:

a) provision of a solution suited to polymer particle formation with at least one substrate;

b) introduction into the solution of a protein which is suited to controlling the size of the polymer particles; and

c) introduction of at least one further protein which is involved in the formation of the polymer particles,

wherein at least one of the proteins introduced in stage b) and/or c) is selected such that it comprises a polymer particle binding domain and at least one binding domain, wherein the at least one binding domain is capable of binding a biologically active substance and/or a coupling reagent.

44 (withdrawn). A process according to claim 43, wherein at least one fatty acid and an acyl CoA oxidase is added to the solution suited to polymer particle formation in stage a).

45 (withdrawn). A process according to claim 43, wherein, in stage a), at least one substrate is added to the solution suited to polymer particle formation in such quantity that it is sufficient to ensure control of the size of the polymer particles.

46 (withdrawn). A process according to claim 43, wherein, in stage b), a polymer particle size-controlling protein is introduced which is derived from the family of phasin-like proteins.

47 (withdrawn). A process according to claim 46, wherein, in stage b), a polymer particle size-controlling protein is introduced which is selected from the group comprising the phasin from *Ralstonia eutropha* and the phasin from *Pseudomonas oleovorans.*

48 (withdrawn). A process according to claim 43, wherein the at least one further protein involved in polymer particle formation used in stage c) is a polymer synthase.

49 (withdrawn). A process according to claim 48, wherein the at least one further protein involved in polymer particle formation used in stage c) is a polymer

synthase which is selected from the group comprising the polymer synthase from *R. eutropha, P. oleovorans, P. putida* and *P. aeruginosa*.

50 (withdrawn). A process according to claim 48, wherein the polymer synthase is added to the solution in such a quantity that it is sufficient to ensure control of the size of the polymer particles.

51 (withdrawn). A process according to claim 43, wherein, in stage a), at least one pharmaceutically active substance is added to the solution.

52 (withdrawn). A process according to claim 43, wherein, in order to control the composition of the lipid layer on the surface of the polymer particle, at least one amphiphilic molecule from the group of phospholipids and ether lipids is added to the solution from step a).

53 (withdrawn). A process according to claim 43, wherein the polymer particle binding domain is part of the protein bound to the surface of the polymer particle, wherein the protein is selected from the group which comprising a polymer depolymerase, a polymer regulator, a polymer synthase and a particle size-controlling protein.

54 (withdrawn). A process according to claim 43, wherein the at least one binding domain which is capable of binding a biologically active substance and/or a

coupling reagent is selected from the group comprising oligopeptides, enzymes, abzymes or non-catalytic proteins.

55 (withdrawn). A polymer particle of polyhydroxyalkyl carboxylates of defined size comprising a surface layer of amphiphilic molecules and at least one protein which is selected from the group comprising a polymer depolymerase, a polymer regulator, a polymer synthase and a particle size-influencing protein, wherein the at least one protein comprises a polymer particle binding domain and a binding domain which is capable of binding a biologically active substance and/or a coupling reagent.

56 (withdrawn). A polymer particle of polyhydroxyalkyl carboxylates of defined size comprising a surface layer of amphiphilic molecules and at least one protein which is selected from the group comprising a polymer depolymerase, a polymer regulator, a polymer synthase and a particle size-influencing protein, wherein the at least one protein comprises a polymer particle binding domain and a binding domain which is capable of binding a biologically active substance and/or a coupling reagent, and wherein the polymer particle is produced according to a process as defined in claim 30.

57 (withdrawn). A pharmaceutical preparation, a pesticide or a herbicide comprising a polymer particle according to claim 55.

58 (withdrawn). A method for treating or preventing a disease of the central nervous system comprising administering a polymer particle of claim 54 to a subject in need thereof.

59 (new). A process for producing polymer particles having surface-bound proteins, the process comprising:

A) providing a cell comprising:

(1) at least one gene that codes for a polymer synthase, the polymer synthase comprising a polymer particle binding domain; or

(2) at least one gene that codes for a fusion protein, the fusion protein comprising a polymer synthase and

(a) at least one binding domain capable of binding one or more biologically active substances or one or more coupling reagents or a combination thereof, or

(b) at least one biologically active protein, or

(c) a combination thereof,

the polymer synthase of the fusion protein comprising a polymer particle binding domain; and

(3) optionally

(a) at least one gene that codes for a protein involved in the formation of polymer particles, the protein comprising a polymer particle binding domain, or

(b) at least one gene that codes for an additional fusion protein, the additional fusion protein comprising

(i) a polymer particle binding domain or a protein involved in the formation of the polymer particles, the protein comprising a polymer particle binding domain, or a combination thereof, and

(ii) at least one biologically active protein or at least one binding domain capable of binding one or more biologically active substances or one or more coupling reagents or a combination thereof, or

(iii) at least one biologically active protein and at least one binding domain capable of binding one or more biologically active substances or one or more coupling reagents or a combination thereof, or

(c) a combination thereof;

B) cultivating the cell in a culture medium so that the cell produces an expression product from the at least one gene and produces polymer particles, wherein the polymer particle binding domain of the expression product is bound to a polymer particle; and

C) separating the polymer particles from the cultivated cells to produce a composition comprising polymer particles having surface-bound proteins.

60 (new). A process according to claim 59, wherein the protein involved in the formation of polymer particles is selected from the group consisting of a phaA thiolase, a phaB ketoacyl reductase, a polymer depolymerase, a polymer regulator, a polymer synthase and a particle size-determining protein or a combination thereof.

61 (new). A process according to claim 60, wherein the particle size-determining protein is a phasin.

62 (new). A process according to claim 60, wherein the polymer regulator is phaR.

63 (new). A process according to claim 60, wherein the polymer depolymerase, polymer regulator, polymer synthase or particle size-determining protein is from a microorganism of the genera Ralstonia, Alcaligenes or Pseudomonas.

64 (new). A process according to claim 59, wherein the polymer synthase is from Ralstonia eutropha, Pseudomonas oleovorans, Pseudomonas putida, Pseudomonas aeruginosa, Aeromonas punctata or Thiocapsa pfennigii.

65 (new). A process according to claim 61, wherein the phasin is phaP from Ralstonia eutropha or phaF or phaI from Pseudomonas oleovorans.

66 (new). A process according to claim 59, wherein the polymer particle binding domain comprises the particle binding domain of a protein selected from the group consisting of a polymer depolymerase, a polymer regulator, a polymer synthase and a particle size-determining protein.

67 (new). A process according to claim 66, wherein the particle size-determining protein is a phasin.

68 (new). A process according to claim 66, wherein the polymer regulator is phaR.

69 (new). A process according to claim 66, wherein the polymer depolymerase, polymer regulator, polymer synthase or particle size-determining protein is from a microorganism of the genera Ralstonia, Alcaligenes or Pseudomonas.

70 (new). A process according to claim 66, wherein the polymer synthase is from Ralstonia eutropha, Pseudomonas oleovorans, Pseudomonas putida, Pseudomonas aeruginosa, Aeromonas punctata or Thiocapsa pfennigii.

71 (new). A process according to claim 67, wherein the phasin is phaP from Ralstonia eutropha or phaF or phaI from Pseudomonas oleovorans.

72 (new). A process according to claim 59, wherein the culture medium comprises at least one fatty acid with a functional side group selected from methyl groups, alkyl groups, hydroxyl groups, phenyl groups, sulfhydryl groups, primary, secondary and tertiary amino groups, aldehyde groups, keto groups, ether groups, carboxyl groups, O-ester groups, thioester groups, carboxylic acid amide groups,

hemiacetal groups, acetal groups, phosphate monoester groups and phosphate diester groups, or a mixture of any two or more thereof.

73 (new). A process according to claim 59, wherein a substrate is added to the culture medium in such a quantity that it is sufficient to ensure control of the size of the polymer particles.

74 (new). A process according to claim 59, wherein the cell is a microorganism selected from

a) the genera consisting of Escherichia, Ralstonia, Alcaligenes, Pseudomonas and Halobiforma; or

b) the group consisting of Ralstonia eutropha, Alcaligenes latus, Escherichia coli, Pseudomonas fragi, Pseudomonas putida, Pseudomonas oleovorans, Pseudomonas aeruginosa, Pseudomonas fluorescens and Halobiforma haloterrestris.

75 (new). A process according to claim 59, wherein a lipid layer located on the surface of the polymer particles is separated from the polymer particles and replaced by a lipid layer of another composition.

76 (new). A process according to claim 59, wherein the polymer particles have a diameter of 10 nm to 3 μm.

77 (new). A process according to claim 59, wherein the polymer particles have a diameter of 10 nm to 900 nm.

78 (new). A process according to claim 59, wherein the polymer particles have a diameter of 10 nm to 100 nm.

79 (new). A process according to claim 59, wherein at least one biologically active substance or at least one dye or a mixture thereof is added to the culture medium and incorporated into the particles.

80 (new). A process according to claim 59, wherein the at least one binding domain is selected from the group consisting of one or more oligopeptides, one or more enzymes, one or more abzymes, one or more non-catalytic proteins, one or more FLAG epitopes and one or more one cysteine residues or a combination thereof.

81 (new). A process according to claim 60, wherein the polymer synthase is bound to the polymer particle by a covalent bond.

82 (new). A process according to claim 59, further comprising

D) binding a coupling reagent to the binding domain.

83 (new). A process according to claim 59, further comprising

D) binding a coupling reagent to the binding domain; and

E) binding a biologically active substance to the coupling reagent.

84 (new). A process according to claim 59, further comprising

D) binding a biologically active substance to the binding domain.

85 (new). A process according to claim 59, further comprising

D) chemically modifying the polymer synthase or the protein involved in the formation of polymer particles to form at least one binding domain by contacting the polymer synthase or the protein with a coupling reagent.

86 (new). A process according to claim 59, wherein the biologically active substance is able to bind another biologically active substance.

87 (new). A process according to claim 59, wherein the biologically active substance comprises a pharmaceutically active substance.

88 (new). A process according to claim 59, wherein the biologically active substance is selected from

A) dideoxyinosine, floxuridine, 6-mercaptopurine, doxorubicin, daunorubicin, 1-darubicin, cisplatin, methotrexate, taxol, antibiotics, anticoagulants, germicides, antiarrhythmic agents and active ingredient precursors or derivatives thereof, or

B) insulin, calcitonin, ACTH, glucagons, somatostatin, somatotropin, somatomedin, parathyroid hormone, erythropoietin, hypothalamic release factors,

prolactin, thyroid-stimulating hormone, endophins, enkephalins, vasopressins, non-naturally occurring opiates, superoxide dismutase, antibodies, interferons, asparaginase, arginase, arginine deaminase, adenosine deaminase, ribonuclease, trypsin, chymotrypsin or pepsin.

89 (new). A process according to claim 59, wherein the biologically active protein is selected from insulin, calcitonin, ACTH, glucagons, somatostatin, somatotropin, somatomedin, parathyroid hormone, erythropoietin, hypothalamic release factors, prolactin, thyroid-stimulating hormone, endophins, enkephalins, vasopressins, non-naturally occurring opiates, superoxide dismutase, antibodies, interferons, asparaginase, arginase, arginine deaminase, adenosine deaminase, ribonuclease, trypsin, chymotrypsin or pepsin.

90 (new). A process according to claim 59, wherein the biologically active substance or the biologically active protein is an antibody or antibody fragment.

91 (new). A process according to claim 85, wherein the coupling reagent is selected from the group consisting of bis(2-oxo-3-oxazolydinyl)phosphonic chloride (BOP-Cl), bromotrispyrrolidinophosphonium hexafluorophosphate (PyBroP), benzotriazol-1-yl-oxy-trispyrrolidinophosphonium hexafluorophosphate (PyBOP), n-hydroxysuccinimide biotin, 2-(1H-benzotriazol-1-yl)-1,1,3,3-tetramethyluronium hexafluorophosphate (HBTU), dicyclohexylcarbodiimide, disuccinimidyl carbonate, 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide (EDC), bis(2-oxo-3-oxazolydinyl)phosphine,

diisopropylcarbodiimide (DIPC), 2-(1H-benzotrioxazolyl)-1,1,3,3-tetramethyluronium tetrafluoroborate (TBTU), 2-(5-norbornene-2,3-dicarboxyimido)-1,1,3,3-tetramethyluronium tetrafluoroborate (TNTU), para-nitrophenylchloroformate, and O-(n-succinimidyl)-1,1,3,3-tetramethyluronium tetrafluoroborate (TSTU).

92 (new). A process according to claim 59, wherein the cell comprises two or more of the at least one gene that codes for a fusion protein.

93 (new). A process according to claim 59, wherein the cell comprises three or more of the at least one gene that codes for a fusion protein.

94 (new). A process according to claim 59, wherein one or more of the surface-bound proteins are removed from the polymer particles.

95 (new). A process according to claim 59, wherein the composition consists essentially of polymer particles having surface-bound proteins.

96 (new). A pharmaceutical preparation, pesticide or herbicide comprising polymer particles produced by a method according to claim 59.

97 (new). A method of binding a second biologically active substance comprising

A) providing a composition of polymer particles produced by a method according to claim 59, wherein optionally a coupling reagent is bound to the binding domain when a binding domain is present, and

B) contacting the composition with a sample comprising a second biologically active substance so that the binding domain or the biologically active protein or the coupling reagent binds the second biologically active substance.

98 (new). A method according to claim 97, wherein the second biologically active substance is an oligopeptide, enzyme, abzyme, noncatalytic protein or antibody.

99 (new). A process for producing polymer particles having surface-bound proteins, the process comprising:

A) providing a cell comprising:

(1) at least one gene that codes for a polymer synthase, the polymer synthase comprising a polymer particle binding domain, and

(2) at least one gene that codes for a fusion protein, the fusion protein comprising

(a) a polymer particle binding domain or a protein involved in the formation of the polymer particles, the protein comprising a polymer particle binding domain, or a combination thereof, and

(b) at least one biologically active protein or at least one binding domain capable of binding one or more biologically active substances or one or more coupling reagents or a combination thereof, or

(c) at least one biologically active protein and at least one binding domain capable of binding one or more biologically active substances or one or more coupling reagents or a combination thereof; or

B) providing a cell comprising:

(1) at least one gene that codes for a fusion protein, the fusion protein comprising a polymer synthase and

(a) at least one binding domain capable of binding one or more biologically active substances or one or more coupling reagents or a combination thereof, or

(b) at least one biologically active protein, or

(c) a combination thereof,

the polymer synthase of the fusion protein comprising a polymer particle binding domain; and

(2) optionally

(a) at least one gene that codes for a protein involved in the formation of polymer particles, the protein comprising a polymer particle binding domain, or

(b) at least one gene that codes for an additional fusion protein, the additional fusion protein comprising

(i) a polymer particle binding domain or a protein involved in the formation of the polymer particles, the protein comprising a polymer particle binding domain, or a combination thereof, and

(ii) at least one biologically active protein or at least one binding domain capable of binding one or more biologically active substances or one or more coupling reagents or a combination thereof, or

(iii) at least one biologically active protein and at least one binding domain capable of binding one or more biologically active substances or one or more coupling reagents or a combination thereof, or

(c) a combination thereof;

C) cultivating the cell in a culture medium so that the cell produces an expression product from the at least one gene and produces polymer particles, wherein the polymer particle binding domain of the expression product is bound to a polymer particle; and

D) separating the polymer particles and the bound expression products from the cultivated cells to produce a composition comprising polymer particles having surface-bound proteins.